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PATENT SPECIFICATION

Application Date: Feb. 5, 1929. No. 3846/29.

328,944

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PROVISIONAL SPECIFICATION.

Improvements in Textile Packages and Processes for Making same.

We, **BRITISH CELANESE LIMITED**, a Company incorporated in accordance with the laws of Great Britain, of Celanese House, 22 & 23, Hanover Square, London, W. 1, and **WILLIAM IVAN TAYLOR**, a subject of the King of Great Britain, of the Works of British Celanese Limited, Spondon, near Derby, do hereby declare the nature of this invention to be as follows:—

This invention, which relates to the packaging of yarns or threads, has for its object the production of an improved package, and includes within its scope an improved process of packaging.

It is well understood that the most economical form of yarn package is one in which the yarn is built on to a spindle or tube by "parallel" winding, the spindle or tube being provided with flanges to form a bobbin between which the yarn is distributed by comparatively slow traversing of the yarn along the length of the bobbin during the winding operation. Winding in this manner enables a compact package to be rapidly formed. The package, however, has the disadvantage that the bulk and weight of the bobbin are disproportionate to the bulk and weight of the yarn itself and add to the cost of storing or transporting the yarn. In addition, during transport and storage, each package holds out of use the bobbin on which it is wound, and a stock of bobbins much larger than the amount of yarn which is at any one time being wound must be kept.

Removal of the yarn package from the bobbin suggests itself as a remedy for the above-recited disadvantages, but the nature of the package is such that on the support afforded by the flanges of the bobbin to the ends of the package being withdrawn, the ends are unable to remain in position and the package is incapable of withstanding even the lightest handling. This is particularly the case when the yarn comprises very smooth filaments such as those of artificial silk, the parallel windings at the end of the package slipping from position at a touch and rendering the package unfit for further use.

It has now been found, however, that

if the turns of yarn on the package are caused to adhere lightly to each other, the package can be removed from the bobbin as a compact and coherent mass which can be submitted to the handling encountered in storage or transport without the yarn being displaced. It is sufficient to provide that only the turns of yarn adjacent the ends of the package are secured against slipping, but the object of the invention may be achieved by causing the whole of the turns of yarn on the package to adhere to each other.

The adhesive used is preferably of such a kind and/or is applied in such a quantity that while solidity is imparted to the package, or the treated parts thereof, the yarn can be unwound from the package without any treatment of the package being necessary. A softening or removing treatment may, however, be resorted to, if necessary, as is explained more fully hereafter with reference to the types of adhesive which may be employed.

Numerous methods may be used for causing the adhesion of the yarn on the package. Thus, according to one method, an adhesive may be applied to the travelling yarn in the course of winding the package, in which case it is convenient to apply the adhesive continuously so that the whole of the yarn on the package is formed into a coherent mass, but an intermittent application of the adhesive to the yarn may be employed, so that only those parts of the yarn which will form the ends of the package are rendered adherent, it generally being sufficient to ensure that the ends of the package are rendered self-supporting. For the purpose of applying adhesive to the travelling yarn, a wick charged with the adhesive may be arranged to intercept the yarn, or the yarn may be passed over an intermittently or slowly revolving wick or fabric covered roller, dipping into a trough of the adhesive, though it is to be understood that the invention is not limited to the use of any particular forms of applying device.

A further method consists in applying the adhesive to the package itself while it is in the course of formation, for example, by spraying the surface of the

rotating package with the adhesive, or by causing adhesive to run or drip or to be wiped from a wick on to the package. In this case also, the application may be restricted to the parts of the package adjacent the flanges of the bobbin. According to another method, the adhesive may be applied to the completed package, either before or after its removal from the bobbin.

Suitable adhesives for use according to the invention comprise substances which may be used in sizing the yarns. Thus, in the case of artificial silk yarns, and particularly cellulose acetate yarns, melted wax, or wax mixtures, or size containing gelatine may be employed. In fact, by applying to the yarn a quantity of the substance just sufficient to cause adhesion of the turns of yarn on the package, the substance may function as a size when the yarn is unwound. For example, the yarn may reach the winding device with just enough molten wax, or it may be, gelatine size, to coat or size the filaments or fibres of the yarn and to impart a tackiness to the yarn which causes the layers or turns of yarn to adhere. Solidifying of the wax or hardening of the size holds the turns securely together, but subsequent unwinding of the waxed or sized yarn is readily effected.

When the adhesion of the yarn has been caused by what may be termed an excess of adhesive, as might occur when the adhesive is applied directly to the package, it may be necessary to treat the package with suitable solvents or softeners for the adhesive before or during unwinding the yarn. For instance, wax applied as an adhesive may be removed or softened by the use of a solvent such as benzene. In other cases, washing may be sufficient.

The invention may be applied to the production of self-supporting yarn packages during any suitable winding operation, such as hank-to-bobbin or bobbin-to-bobbin winding. It is, however, particularly applicable to the packaging of artificial silk yarn, especially in the course of the production of the yarn by the dry or evaporative method. The following description is illustrative of a process of packaging according to the invention as carried out continually with the production of yarn comprising filaments of cellulose acetate by the dry or evaporative method.

The filaments of cellulose acetate on leaving the spinning chamber pass round a feed roller (preferably after being lubricated in any suitable manner, and are led to a winding or twisting and winding device, for example, a cap-spinning apparatus. Between the feed roller and the winding device, the filaments pass over a wick or other device which applies a coating of adhesive to the filaments. In the case of adhesives which require to be heated or melted before application, the trough from which the adhesive is supplied is provided with suitable heating means.

The coating is such that the turns of filaments adhere to each other on the yarn package, so that the package can be removed from the bobbin without breaking down after the adhesive has set. A suitable period of time may be allowed to elapse before attempting the removal of the package, in order to ensure that the adhesive has hardened sufficiently to strengthen the package. Prior to packaging, the yarn may be lubricated by passage over a wick, roller or other device supplied with lubricant.

Any form of bobbin which allows the ready removal of the package may be employed, a suitable construction of bobbin comprising a tube fitted with a flange at one end and provided with means to receive a removable flange at the other. The removable flange may be screwed on to the tube, and when the flange is formed of comparatively soft material such as fibre or wood, it may be fitted with a screwed bush to prevent excessive wear on the screw-threads. In operation, a paper, cardboard, fibre, or other light tube may be placed on the bobbin tube and receives the yarn, and the said light tube is retained in the package on its removal from the bobbin. The light tube may be held against rotation relative to the bobbin tube by friction with the bobbin tube or flanges, or its ends may engage annular grooves in the inside faces of the bobbin flanges. A similar bobbin may be used to carrying the package in the unwinding of the yarn.

Dated this 5th day of February, 1929.

WHITEHEAD & STEPHENS,
Chartered Patent Agents,
Celanese House, 22 & 23, Hanover Square,
London, W. 1.

COMPLETE SPECIFICATION.

Improvements in Textile Packages and Processes for Making same.

We, BRITISH CELANESE LIMITED, a Company incorporated in accordance with the laws of Great Britain, of Celanese House, 22 & 23, Hanover Square, London,

W. I. and WILLIAM IVAN TAYLOR, a subject of the King of Great Britain, of the Works of British Celanese Limited, Spondon, near Derby, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention, which relates to the packaging of yarns or threads, has for its object the production of an improved package, and includes within its scope an improved process of packaging.

It is well understood that the most economical form of yarn package is one in which the yarn is built on to a spindle or tube by "parallel" winding, the spindle or tube being provided with flanges to form a bobbin between which the yarn is distributed by comparatively slow traversing of the yarn along the length of the bobbin during the winding operation. Winding in this manner enables a compact package to be rapidly formed. The package, however, has the disadvantage that the bulk and weight of the bobbin are disproportionate to the bulk and weight of the yarn itself and add to the cost of storing or transporting the yarn. In addition, during transport and storage, each package holds out of use the bobbin on which it is wound, and a stock of bobbins much larger than the amount of yarn which is at any one time being wound must be kept.

Removal of the yarn package from the bobbin, as by removal of one or both of the bobbin flanges, suggests itself as a remedy for the above-recited disadvantages, but the nature of the package is such that after the support afforded by the flanges of the bobbin to the ends of the package is removed, the ends of the package are unable to remain in position and the package is incapable of withstanding even the lightest handling. This is particularly the case when the yarn comprises very smooth filaments such as those of artificial silk, the parallel windings at the end of the package slipping from position at a touch and rendering the package unfit for further use.

It has now been found, however, that if the turns of yarn on the package are caused to adhere lightly to each other, the package can be removed from the bobbin as a compact and coherent structure which can be submitted to the handling encountered in storage or transport without the yarn being displaced.

According to the invention, therefore, the ends of a yarn package are rendered self-supporting by the employment of an adhesive that causes turns of yarn on the package to stick to each other. It is

sufficient to provide that only the turns of yarn adjacent the ends of the package are secured against slipping, but the object of the invention may be achieved by causing the whole of the turns of yarn on the package to adhere to each other. If desired, the end turns of the yarn package may be caused to adhere to each other and in addition the turns of yarn on the outer periphery of the package may be secured by an application of adhesive.

The adhesive used is preferably of such a kind and/or is applied in such a quantity that while solidity is imparted to the package, or the treated parts thereof, the yarn can be unwound from the package without any treatment of the package being necessary. A softening or removing treatment may, however, be resorted to, if necessary, as is explained more fully hereafter with reference to the types of adhesive which may be employed.

Numerous methods may be used for causing the adhesion of the yarn on the package. Thus, according to one method, an adhesive may be applied to the travelling yarn in the course of winding the package, in which case it is convenient to apply the adhesive continuously so that the whole of the yarn on the package is formed into a coherent mass, but an intermittent application of the adhesive to the yarn may be employed so that only those parts of the yarn which will form the ends of the package are rendered adherent, it generally being sufficient to ensure that the ends of the package are rendered self-supporting. The yarn should, of course, be wet with the adhesive as it is being wound in order to ensure that the layers of yarn stick together. Preferably, the adhesive is of such a nature that it solidifies or hardens on the package. For the purpose of applying adhesive to the travelling yarn, a wick charged with the adhesive may be arranged to intercept the yarn, or the yarn may be passed over an intermittently or slowly revolving wick or fabric covered roller, dipping into a trough of the adhesive, though it is to be understood that the invention is not limited to the use of any particular form of applying device.

A further method consists in applying the adhesive to the package itself while it is in the course of formation, for example, by spraying the surface of the rotating package with the adhesive, or by causing adhesive to run or drip or to be wiped from a wick on to the package. In this case also, the application may be restricted to the parts of the package adjacent the flanges of the bobbin. According to another method, the adhesive may be applied to the completed package.

either before or after its removal from the bobbin.

Suitable adhesives for use according to the invention comprise substances which may be used in sizing the yarns. Thus, in the case of artificial silk yarns, and particularly cellulose acetate yarns, melted wax, or wax mixtures, or size containing gelatine may be employed. In fact, by applying to the yarn a quantity of the substance just sufficient to cause adhesion of the turns of yarn on the package, the substance may function as a size when the yarn is unwound. For example, the yarn may reach the winding device with just enough molten wax, or it may be, gelatine size, to coat or size the filaments or fibres of the yarn and to impart a tackiness to the yarn which causes the layers or turns of yarn to adhere. Solidifying of the wax or hardening of the size holds the turns securely together, but subsequent unwinding of the waxed or sized yarn is readily effected.

In some cases and particularly when the adhesion of the yarn has been caused by what may be termed an excess of adhesive, as might occur when the adhesive is applied directly to the package, it may be desirable or necessary to treat the package with suitable solvents or softeners for the adhesive before or during unwinding the yarn. For instance wax applied as an adhesive may be removed or softened by the use of a solvent such as benzene. In other cases, washing may be sufficient.

The invention may be applied to the production of self-supporting yarn packages during any suitable winding operation, such as hank-to-bobbin or bobbin-to-bobbin winding. It is, however, particularly applicable to the packaging of artificial silk yarn, especially in the course of the production of the yarn by the dry or evaporative method. The following description is illustrative of a process of packaging according to the invention as carried out continuously with the production of yarn comprising filaments of cellulose acetate by the dry or evaporative method.

The filaments of cellulose acetate on leaving the spinning chamber pass round a feed roller (preferably after being lubricated in any suitable manner) and are led to a winding or twisting and winding device, for example, a cap-spinning apparatus. Between the feed roller and the winding device, the filaments pass over a wick, roller or other device which applies a uniform coating of adhesive to the filaments. In the case of adhesives which require to be heated or melted before application, the trough from which the adhesive is supplied is provided with suitable

heating means.

The coating is such that the turns of filaments adhere to each other on the yarn package, so that the package can be removed from the bobbin without breaking down after the adhesive has set. A suitable period of time may be allowed to elapse before attempting the removal of the package, in order to ensure that the adhesive has hardened sufficiently to strengthen the package. Prior to packaging, the yarn may be lubricated by passage over a wick, roller or other device supplied with lubricant.

Any form of bobbin which allows the ready removal of the package may be employed, a suitable construction of bobbin comprising a tube fitted with a flange at one end and provided with means to receive a removable flange at the other. The removable flange may be screwed on to the tube, and when the flange is formed of comparatively soft material such as fibre or wood, it may be fitted with a screwed bush to prevent excessive wear on the screw-threads. In operation, a paper, cardboard, fibre, or other light tube may be placed on the bobbin tube and receives the yarn, and the said light tube is retained in the package on its removal from the bobbin. The light tube may be held against rotation relative to the bobbin tube by friction with the bobbin tube or flanges, or its ends may engage annular grooves in the inside faces of the bobbin flanges. A similar bobbin may be used to carry the package in the unwinding of the yarn.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. Process of packaging yarns or threads, comprising causing turns of yarn or thread on a package to adhere to each other by the application of an adhesive, whereby the ends of the package are rendered self-supporting.

2. Process according to Claim 1 wherein only the turns of yarn or thread adjacent the ends of the package are caused to adhere to each other.

3. Process according to Claim 1 wherein only the turns of yarn or thread adjacent the ends and outer periphery of the package are caused to adhere to each other.

4. Process according to any of the preceding claims, wherein the adhesive is applied to the yarn or thread while it is travelling to the package in the course of the packaging operation.

5. Process according to any of Claims 1 to 3, wherein the adhesive is applied to the package itself during the course of its

formation.

6. Process according to any of Claims 1 to 3, wherein the adhesive is applied to the completed package.

5 7. Process according to any of the preceding claims, wherein wax, a wax mixture, or gelatine or other size is employed as the adhesive.

10 8. Process according to any of the preceding Claims 1, 2, 3, 4, 5 and 7 wherein an adhesive is applied to artificial yarn or thread or to the package continuously with the production of the yarn or thread.

15 9. Process of packaging yarns or threads substantially as described.

10. Self-supporting yarn or thread package in which turns of yarn or thread on the package adhere to each other.

20 11. Self-supporting package according to Claim 10, in which only the turns of

yarn or thread adjacent the ends of the package adhere to each other.

12. Self-supporting package according to Claim 10 in which only the turns of yarn or thread adjacent the ends and outer periphery of the package adhere to each other. 25

13. Self-supporting package according to Claims 10 to 12 wherein wax, wax mixtures, or gelatine or other size causes the turns of yarn or thread to adhere to each other. 30

14. Self-supporting yarn or thread packages substantially as described.

Dated this 5th day of November, 1929.

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